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## A SIMPLE METHOD OF CONSTRUCTING A HYPERBOLIC PARABOLOID.

BY E. J. CUY [COUYUMDJOPOLLOS].

The famous "saddle-shaped surface,"  $z = ax^2 - by^2$ , so useful in demonstrating the peculiarities of fairly complex surfaces,—such, for example, as the fact that a surface may give a curve with a maximum (a parabola) as its intersection with one of the coördinate planes, a curve with a minimum with another and two straight lines with the third,—is not a very easy surface to construct.

The following is a simple method of constructing it:—

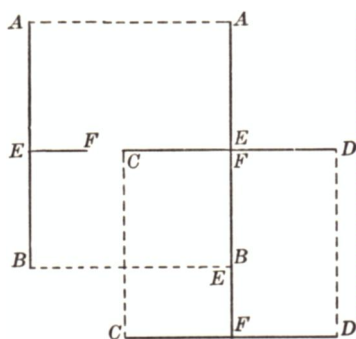


FIG. 1.

Two equal pieces of straight stiff wire (or glass rod),  $AB$  and  $CD$ , are soldered to a third piece  $EF$  perpendicular to it and perpendicular to each other, as shown in figures 1 and 2. Then starting at  $E$ ,  $EA$  and  $EB$  are divided into an equal number of equal parts.  $CF$  and  $FD$  are divided similarly.

Then by means of thread join point 1 of  $AE$  to point 1 of  $CF$ , point 2 of  $AE$  to 2 of  $CF$ , etc. A shellac coating on  $AB$  and  $CD$  before and after winding the thread will keep it in position.

If  $AB$  is now rotated about  $EF$  through an angle of  $45^\circ$  and the midpoint  $G$  of  $EF$  is chosen as the origin,  $EF$  will be the

$x$ -axis of the hyperbolic paraboloid, and a vertical and a horizontal line both perpendicular to  $EF$  at  $G$  will be the  $z$ - and the  $y$ -axes respectively.

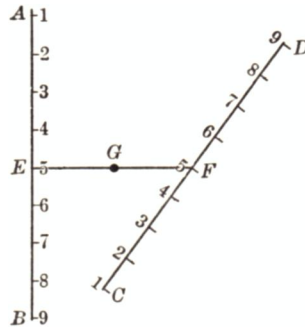


FIG. 2.

If either  $E$  or  $F$  is used as the origin and  $EF$  as the  $z$ -axis, the equation of the surface will be

$$xz = (c - z)y, \quad \text{or} \quad (x + y)z = cy.$$

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